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REPRESENATION AND ECONOMIC VALUATION OF INFORMATION IN LAY ECONOMIC THINKING

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Abstract

The increasing importance of information in contemporary societies, as well as the paradoxes of information and mainly the uncertainty surrounding its value, raise several questions concerning the valuing of information and of information producers by laymen. In our studies we examined whether informational goods are undervalued, compared to material goods, by potential buyers and sellers. Also, we examined the social representations of information, which provide an insight about the lay meaning of information. Finally, we investigated whether the undervaluation of information generalizes to the remuneration of professionals producing pure information (invention) compared to those who apply this information in order to produce material goods. Results showed that, whereas informational goods are devalued compared to material goods, the remuneration of intellectual professionals producing pure information is overvalued compared to this of intellectual professionals applying this information to produce services or material goods. The investigation of the structure of the social representations of information showed that the central core of the representation of information is mainly composed of categories referring to traditional media, functions and technologies of information, while contemporary functions and technologies are less frequent or absent.

Keywords: *Information's Valuation, Remuneration of Information-Knowledge Producers, Social Representation of Information, Lay Thinking, Uncertainty, Common Knowledge, Involvement*

1 INTRODUCTION

The increasing importance of information in contemporary societies raises several questions concerning the valuation of information and the remuneration of professionals producing information in lay economic thinking. Stigler (1961) was the first to show that information is not free but is a useful and exchangeable good and that people have limited money and time to search for it. However, information is a paradoxical good with uncertain quality and value. Its intrinsic characteristics, mainly its indivisibility, inappropriability, intangibility and reproducibility with zero cost lead to a number of paradoxes concerning its economic value. Arrow (1962), in a pioneer article which concerns invention but also applies to information, since Arrow defines invention as a new information product, suggests that the value of information is not known to the buyer until he owns it. Thus, the first paradox is that possessing information is a condition for the precise valuation of information's quality and value. The second paradox concerns uncertainty regarding the income that information will provide to its owner or producer. Dionne (1988) states that an agent who possesses information can easily exclude others from the consumption of this information, but if he wishes to sell the information it will be difficult for him to benefit from the income associated with it, since once it has become known to another agent, information can be easily transmitted to others with zero cost.

Experimental studies who focused on the valuation of information revealed different aspects of the uncertainty surrounding information's economic value. Thus, focusing on risk attitudes and their correlation with the value of information, Schoemaker (1989) showed that there is no correlation between subjects' risk attitudes and their preference for probability vs payoff information. Rauchs and Willinger

(1996) showed that individuals recognize that perfect information has value since subjects are willing to invest more on a risky venture if perfect information is available than if it were not. Nevertheless, individuals under-appreciate the value of perfect information because they fail to recognize the importance of statistical information in forming judgments (Rötheli, 2001; Meyer & Shi, 1995). Acording to the findings of Delquié (2004) who examined the value of information by subjects who had to make a risky choice between either perfect information or an option on an uncertain outcome, even though these two situations were strategically equivalent and should have been valued identically, subjects did not value the two situations in exactly the same way. Finally Raban and Rafaeli (2006) showed that copy information is more strongly undervalued by laymen compared to original information.

This paper presents a summary of findings issued from five interrelated research studies conducted on the lay valuation of information and information producers and on the social representations of information. It aims to show the repercussion of the uncertainty surrounding information's value on its valuation buy laymen. It also aims to examine the meaning of information for laymen and the extend to which the social representations of information integrate some of the aspects of information and information processing which, in the contemporary societies, endow information with a valuable economic status.

2 STUDY ONE: BUYERS' VALUATION OF INFORMATIONAL VS MATERIAL GOODS

In order to examine the valuation of information by laymen, we carried out an experimental study. In this experiment, we presented laymen with experimental conditions, where they could make profit by purchasing either valuable information or valuable material goods. The expected profit being the same for both material and informational goods, participants were asked which was the maximum price they were willing to pay in order to purchase the good (for details on the experimental manipulation, sample, and results, see Sakalaki, & Kazi, 2007).

The findings of this study showed that, in all conditions under examination, subjects underestimated the value of both material and informational goods and, thus, did not behave perfectly rationally. However, what is interesting to point out here is not the absolute value attributed to either the informational or material goods, but their relative valuation: immaterial goods were systematically undervalued compared to material goods (see Table 1). Furthermore, the arguments used to justify valuations differed significantly between informational and material products. Participants justified their valuation of information with arguments which seem to incorporate the uncertain character of its value, effectiveness and trustworthiness, and which therefore suggest the reservations and hesitancy of participants presented with informational goods. In contrast, the valuation of material goods was justified by the rational economic argument of maximization of profit.

Expected profit:	1,000 € (Low Involvement)			100,000 € (High Involvement)		
Type of product:	Material	Data informational	Expert Informational	Material	Data informational	Expert Informational
Proposed price in euro	398	148	201	43030	9495	5456
Percentage of proposed price	39.8	14.8	20.1	43.0	9.5	5.5

Table 1. Mean price proposed by potential buyers for data informational, expert informational and material goods, under conditions of low and high involvement

3 STUDY TWO: THE VALUATION OF INFORMATION BY SELLERS

A second research (Sakalaki & Kazi, 2009) which included three separate studies investigated:

(a) If undervaluation of information is also confirmed for sellers. If this is the case, then a strong argument appears supporting not only the subjective judgment of individuals about the uncertain value of information but the existence of a common knowledge about the value of information. Indeed, in order to construct a value, sellers must also take under consideration the potential buyers' willingness to pay, i.e., they must infer how much buyers will accept to pay. In other words, we should then deal with a rather consensual judgment, a convention or tacit norm shared by all, a common knowledge concerning the value of information: everybody knows that, and everybody knows that all the others know, that information worth less than material goods, ceteris paribus.

b) If the undervaluation of information generalizes to the estimation by laymen of the remuneration of professionals producing informational vs material goods.

c) Finally, we studied the structure and components of the social representations of information.

In our second study, we presented laymen with experimental conditions, where they could make profit by selling either valuable information or valuable material goods (for details on the experimental manipulation, sample, and results, see Sakalaki, & Kazi, 2009). Results have replicated the findings of study One, showing that material goods are valued more highly, especially in the condition of high expected profit by the buyer, whereas the opposite pattern appears when the product for sale is information: in the condition of high expected profit by the buyer the proposed selling price for information is even lower. When it comes to informational goods, it seems that not only information is, in general, sold at a lower price than material products, but that, additionally, sellers of information are even more hesitant to ask for a high price when the buyer is going to earn more and should, consequently, pay more in order to obtain the good in question. These findings strengthen those previously found, when examining the attitudes of buyers of information.

4 STUDY THREE: DOES THE UNDERVALUATION OF INFORMATION GENERALIZE TO THE ESTIMATION OF REMUNERATION OF PROFESSIONALS PRODUCING PURE INFORMATION VS PRODUCING MATERIAL PRODUCTS?

Given the results of Study One and Two, as well as previous findings (Sakalaki & Thépaut, 2005), which showed that laymen tend to undervalue informational goods, it was interesting to investigate if laymen also undervalue the remuneration of professionals who produce pure information (e.g. researchers or inventors), compared to the remuneration of professionals applying knowledge to produce material products (e.g., practitioners) (for details on the experimental procedure, sample, and results, see Sakalaki, & Kazi, 2009). Results of this study have shown that the work of researchers-inventors, that is information producers, was valued more highly in all conditions compared to the work of professionals applying this information-knowledge, that is, practitioners (see Table 2).

	Type of profession			
	Psychologist		Civil Engineer	
	Researcher (n=21)	Practitioner (n=26)	Researcher (n=18)	Practitioner (n=20)
Proposed remuneration in euro	39571 €	28057 €	47444 €	36750 €

Table 2. Mean remuneration proposed by laymen as a function of profession

5 STUDY FOUR – PART ONE: A STRUCTURAL APPROACH OF SOCIAL REPRESENTATIONS OF INFORMATION

In order to reveal the social representations of information, we carried out a fourth study (for details, see Sakalaki, & Kazi, 2009). In this study we used the free evocation technique. More specifically, we asked participants to write down the first three words that came to their mind when they think about "information". We did not give any other specifications or instructions and, to our knowledge, the participants did not have any specific knowledge about management or IT systems. Then, a content analysis was applied on the list of words in order to reduce this list into conceptually coherent, exclusive, exhaustive, objective and homogenous categories. The categories that emerged were 13, with an additional category named "other", which included all the words that could not be included in any of the 13 categories and their frequency was too low to form an additional homogenous category. Finally, we applied the structural approach method on our data. According to the results of this study, the main elements of the central core are the categories **news** and **audio and audio-visual mass media**. Thus, what structures the representation and makes it meaningful is fundamentally the function of transmitting news *via* classical media. Most of the peripheral elements represent qualifications, utilities, characteristics or uses and misuses of this fundamental function (misinformation, illegal manipulation, reliability, objectivity, etc.). Although included in the central core, **new technologies of information** have a comparatively lower frequency. Finally it is only in the dynamic area of the periphery of the representation that we find elements like **knowledge, learning, information processing** (see Table 3).

		Rank of appearance	
		Strong rank of appearance	Weak rank of appearance
		<1.96	≥ 1.96
Frequency	High frequency >17	**news: 42 (1.62)*** **audio and audiovisual mass media: 29 (1.62)** **new technologies of information: 21 (1.76)** **economic objects and concepts: 18 (1.94)**	learning, knowledge and information processing: 30 (2.07) press, traditional media of information: 24 (2.67)
	Low frequency ≤17	secrets: 5 (1.80)	misinformation: 14 (2.21) reliability: 10 (2.00) functions and utilities: 11 (2.00) interpersonal communication: 6 (2.67) illegal and condemned manipulation of information: 5 (2.00) power: 4 (2.00)

*The values following each category is the obtained frequency and numbers in parenthesis is the rank value for the category. Number of participants: 85, Total number of words provided by participants: 249
Missing: 6, Rest or "other elements": 30, Total number of words included in the analysis: 219

Table 3. The structure of the social representation of information

6 STUDY FOUR: PART TWO: A FURTHER INVESTIGATION OF THE CENTRAL CORE OF THE REPRESENTATION OF INFORMATION

Based on the results of the structural analysis of the representation of information (see Study Four – Part One), we created a list which included all the items that emerged from the structural approach described above. We presented this list to the 85 participants and we asked them (a) to choose only one item which, according to their opinion, was the most closely related to 'information', and (b) to choose again one item

which they considered that the majority would choose as the most closely related to 'information' (for details, see Sakalaki, & Kazi, 2009) .

This method aims to verify whether subjects would chose for themselves the prior element of the core of the representation as emerged from the structural analysis and, additionally, to reveal whether there is an overlap between the personal choice and the choice attributed to others, that is the perceived consensual dimension of the representation. The findings of this research were slightly different from the previous one, in that new technologies of information was the most frequently chosen (by 40 participants), followed by news (chosen by 29 participants), TV – radio (chosen by 19 participants), press (19) and knowledge – learning (18). When attributing choice to the majority, the order of frequency was as follows: TV – radio (63), new technologies of information (45), and news (19).

7 DISCUSSION

Our studies aimed to investigate the valuation of information by laymen when they are in the position of buyers or sellers of valuable information, compared to laymen who are buyers or sellers of valuable material goods. It also aimed to study if the undervaluation of information generalizes to lay estimations of the remuneration of professionals producing or transforming pure information versus material goods. Finally, a structural approach of the social representation of information intended to analyze the meaning attributed to information by socially constructed knowledge.

Studies 1 and 2 showed that both buyers and sellers systematically underestimate information, both absolutely and relatively compared to material goods. That is, they sell and buy information cheaper than material goods. The tendency to devalue even more the informational goods in condition of high involvement, that is when expected profit, and thus investment and risk for buyers are high, already observed in study 1 (Sakalaki and Kazi, 2007) for buyers of information, is confirmed for sellers, even though sellers are not directly affected by the economic disadvantages related to the higher risk undertaken in condition of high involvement. These findings suggest that the risk associated to the purchase of information constitutes a common knowledge: Sellers, just as buyers, seem to think that information is less valuable, since they lower information's price compared to the price of material goods.

The structural approach of the social representation of information (Study 4) showed that the main elements of the central core of the representation refer to rather ancient functions and technologies of information like **news** and **audio** and **audio-visual media** (TV and radio). Moreover, the items related to the crucial social and economic role of information (e.g. **knowledge, learning, information processing),** are situated in the dynamic zone of the periphery and not in the central core of the representation. Last but not least, the reference to cognitive processes applying to creative or innovating uses of information, like invention, creative synthesis which lead to scientific knowledge, construction of new ideas, conceptions, symbols or forms, which actually constitute, from an economic point of view, the most valuable aspects of information processing are totally absent. In other words, the social representation of information has not yet integrated some of the most relevant aspects of information which, in the contemporary economic systems where the immaterial primes, endow information with a more valuable economic status. Thus, social representations of information provide insight into some reasons, at least, which determine the undervaluation of information.

The results of the third study showed an inversion of the tendency, with participants overestimating remunerations of intellectual professionals who produce pure information in comparison to intellectual professionals who apply this information in order to produce material or cultural goods. Thus, the specificities and paradoxes of information do not appear to generalize to the estimation of the remuneration of professionals producing pure information. Probably the work necessary to produce scientific knowledge is judged to be more valuable than the work consisting in applying this knowledge, independently of the materiality of the outcomes produced. In this case, the indirect utility of information

primes on the uncertainty surrounding its value. It is also possible that the lay concept about information does not necessarily include science and production of new knowledge, although objectively these categories partly coincide with the concept of information since they all refer to informational - immaterial elements. It is noteworthy that the concept of science is absent both from the central core and the peripheral elements of the representation of information.

The above questions should be examined in other cultural contexts in order to see if these findings can be generalised. The interference between scientific and lay assumptions about information, as well as the relationship between the constructs of information and science in lay thinking must also be further investigated by future studies. The undervaluation of the former do not generalize to the later, perhaps because science and scientific products incorporate the surplus conferred by the long studies required in order to produce or transform this specific kind of informational good, independently of the material, immaterial or cultural nature of the product issued from scientific activity. Therefore, accumulation of knowledge and knowing-how procedures and activation of this knowledge in order to invent or create new information is a competence highly valuated by lay thinking while, paradoxically, the product issued from this kind of expert activity, is represented as less valuable.

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